Mediciones y Estándares para las Emisiones Vehiculares
NOM-163-SEMARNAT-ENER-SCFI-2012

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Taller Regional de Metrología y Retos Tecnológicos en las Ciencias del Clima y Energía Renovable

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INSTITUTO NACIONAL DE ECOLOGÍA
Y CAMBIO CLIMÁTICO

Passenger Vehicle Fuel Economy and Greenhouse Gas Standard - Mexico

NORMA OFICIAL MEXICANA
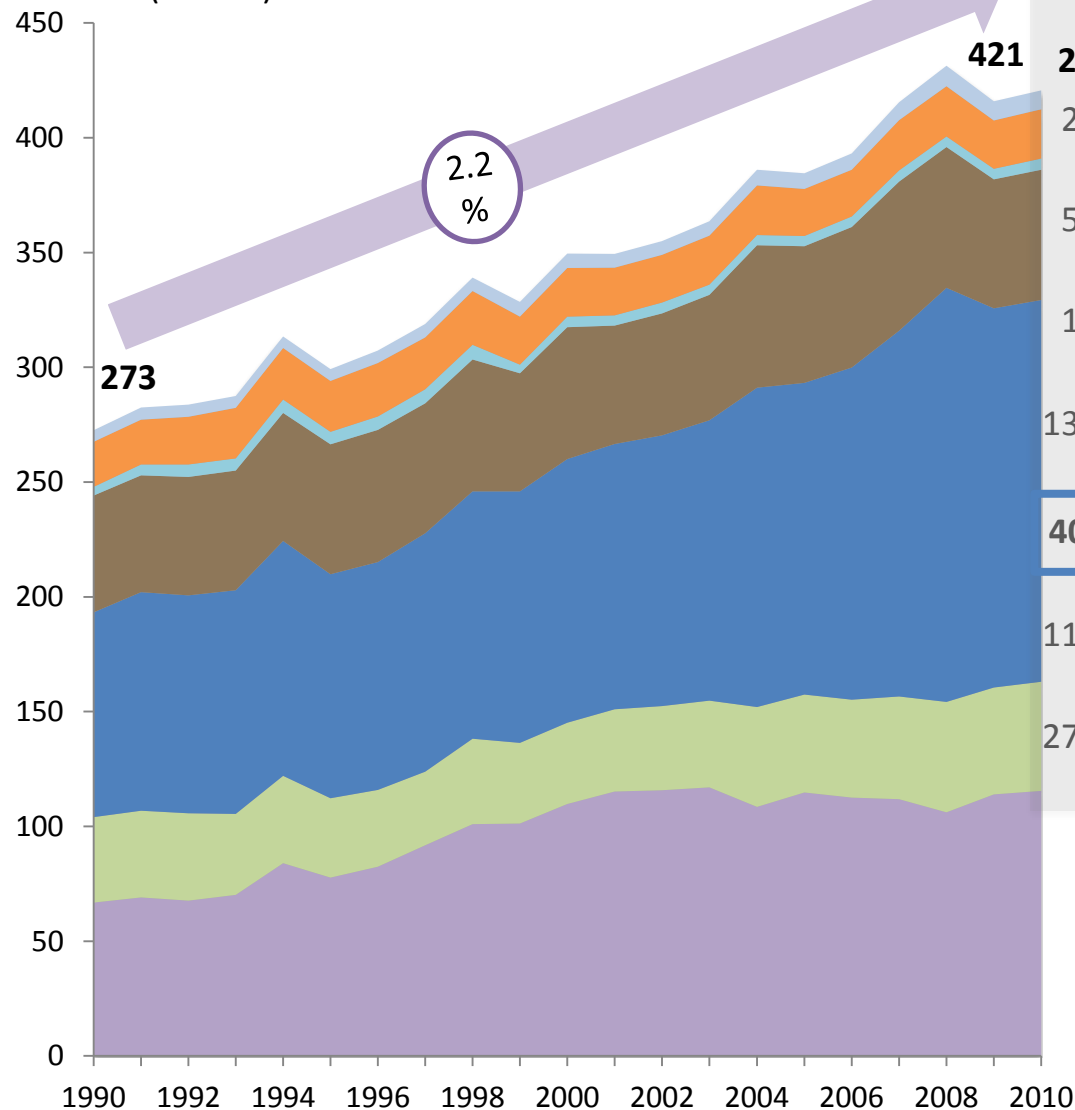# NOM-163-SEMARNAT-ENER-SCFI-2012

Content

- Motivation

- CO_2 Emissions and Fuel Economy Standard for Mexico

- Regulatory alternatives

- Cost – benefit analysis

- Methodological problems

- Recommendations and lesson learned

- Appendix. Methodological details

GHG Emissions Trends from Energy Use

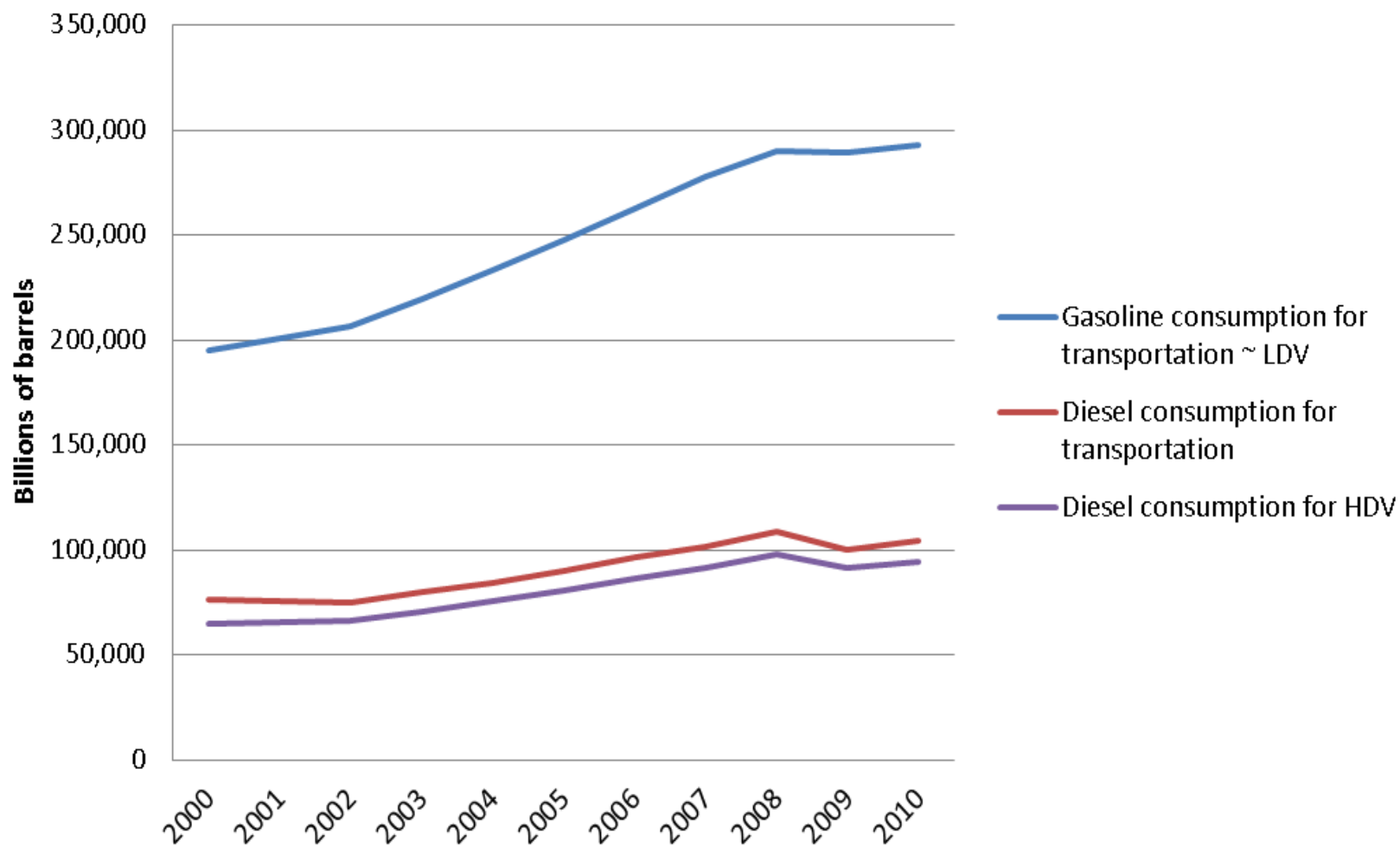**Energy Emissions Evolution**

MtCO2e (INEGEI)

	'90 -'10	'90 -'00	'01 -'10
PIB	2.5%	3.4%	1.9%
Emisiones energía	2.2%	2.5%	2.1%

Agropecuario			
Residencial			
Comercial			
Manufactura y construcción			
Transporte	3.2%	2.6%	4.1%
Consumos propios			
Generación electricidad			

Chart percentages (2010):
- Agropecuario 2.0%
- Residencial 5.1%
- Comercial 1.1%
- Manufactura y construcción 13.5%
- Transporte 40.0%
- Consumos propios 11.3%
- Generación electricidad 27.5%

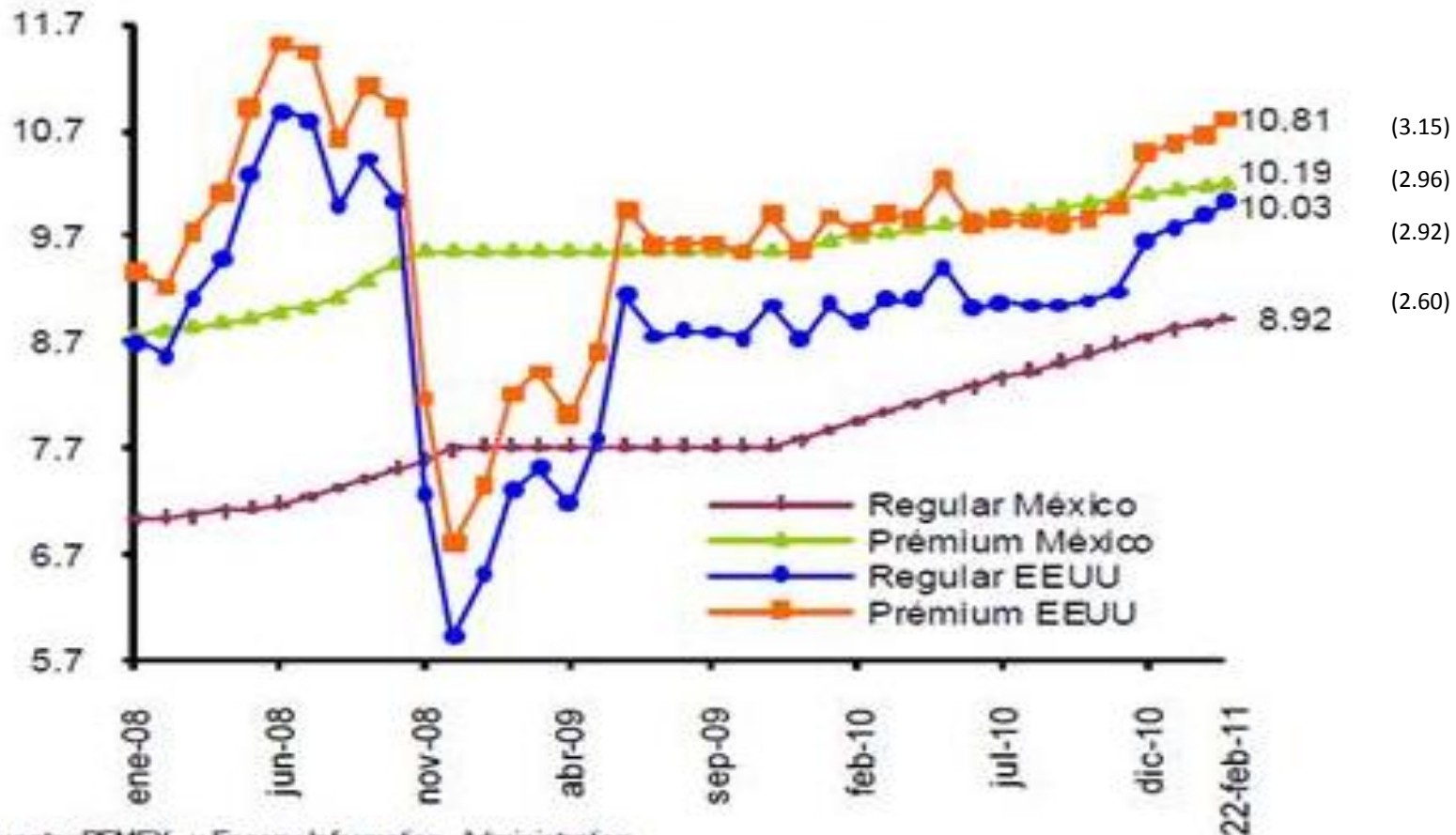Values: 273 (1990), 421 (2010), 2.2%

Consumption Fuel Trends

Fuel Consumption by Vehicle Type, 2000-2010

Fuente: XXXXX

Price Fuel Trends

Gasoline Price, 2008-2011 [pesos / liter, (USD/gallon)]

Regular México
Prémium México
Regular EEUU
Prémium EEUU

10.81 (3.15)
10.19 (2.96)
10.03 (2.92)
8.92 (2.60)

Fuente: PEMEX y Energy Information Administration.

Mexican CO_2 Emissions and Fuel Economy Standard:

NOM-163-SEMARNAT-ENER-SCFI-2012

Key characteristics

- The standard establishes values and parameters for calculating the emissions target of CO_2 for every manufacturer marketing new light vehicles for the period 2014-2016.

- The calculation method is consistent with the American regulation as follows:

  - Sets weighted averages for each corporate sales based on footprint attribute (vehicle size)

  - Define separate targets for two categories, passenger vehicles (PV) and light trucks (CL)

  - Use formulas "CAFE" to define targets in CO_2 emissions and fuel efficiency equivalencies

  - Allows use of flexibilities: voluntary years (2012-2013) with the possibility to use as credits surpassing in subsequent years, generation and exchange credits for surpassing during 2014-2016, and exchange of credits between assemblers

The global target for all new light vehicles fleet in 2016 is 157.5 g CO_2/km (14.9 km/l)
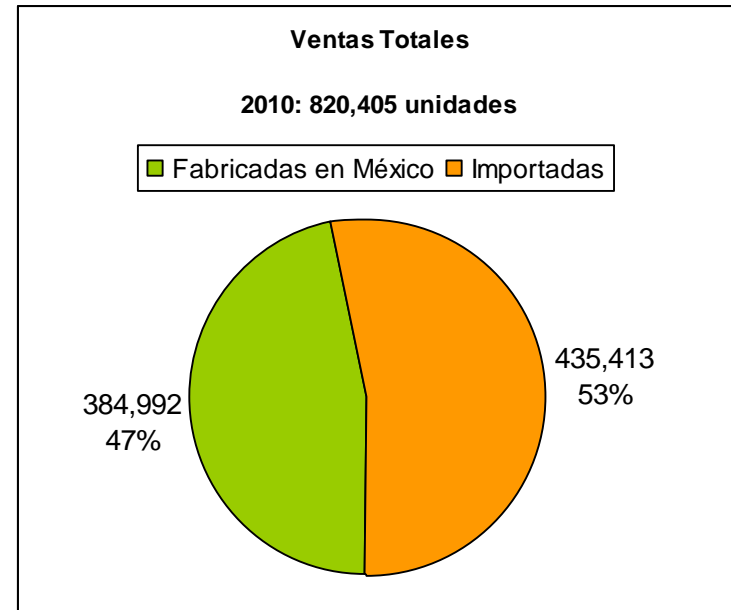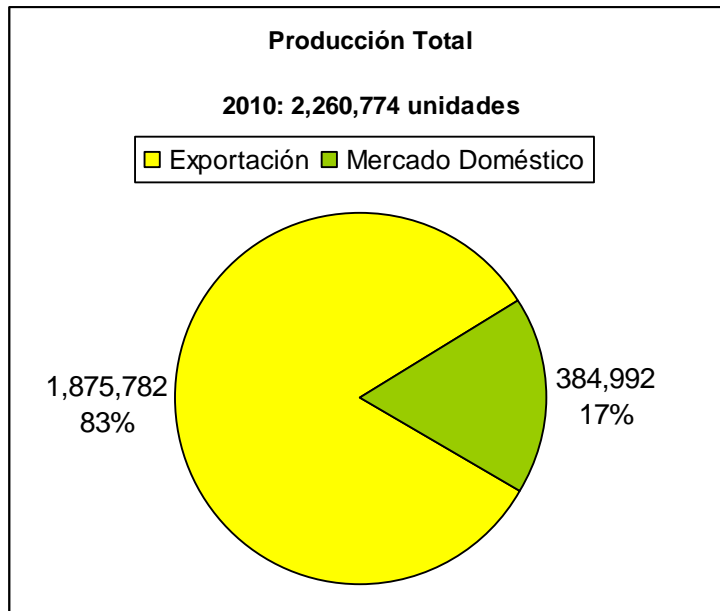
Comparison between the regulation of the United States and Mexico

Concept	CAFE EE.UU.	MX NOM163

Emissions and fuel economy in the base year 2008:
     CO_2 emissions (gCO2/km)
     Fuel Efficiency (km / l)
	
	211.5
	11.1
		
		198.8
		11.8

Application Period	2012-2016	2014-2016
Effort over its base year 2008 (%)	30	26

Projected goals for the 2016 model year fleet
     CO_2 emissions (gCO2/km)
     Fuel Efficiency (km / l)
	
	162
	14.5
		
		157.5
		14.9

Sales-weighted Corporate Average	Yes	Yes
Independent parameters for passenger cars and light trucks	Yes	Yes
Attribute	Footprint	Footprint
Flexibilities		
Generation of credits and debits for different years and exchange between corporates	Yes	Yes
Reduction of targets for country conditions (topography and altitude)	No	Yes
Early credits	2009 -2011	2012-2013
Credits for vehicles using ethanol (Flex-Fuel vehicles)	Yes	No

Mexican auto market, 2010

Most of the capacity production of the Mexican automotive industry is focused on export, which is directed to markets with energy efficiency regulations, such as USA and members of the European Union.

Producción Total

2010: 2,260,774 unidades

☐ Exportación ☐ Mercado Doméstico

1,875,782
83%

384,992
17%

Ventas Totales

2010: 820,405 unidades

☐ Fabricadas en México ☐ Importadas

435,413
53%

384,992
47%

The five corporate with higher sales in Mexico are GM, Nissan, VW, Ford and Chrysler, which have a participation in sales of 82% in the market.

Source: www.amia.com.mx, sitio web de la Asociación Mexicana de la Industria Automotriz, septiembre 2011.

Credits in NOM163

- The generation and use of credits are divided: 1) credit for prior performance; 2) credits for high performance technologies; 3) AC credits; 4) credits related to technology penetration; 4) Corporate exchange and use of credits in time (carry back and carry forward)

- The maximum generation of credits are those granted by CAFE credits for FFVs (0.5 km/l).

- For the prior performance credits we use the values and parameters of CAFE for the years 2012 and 2013 plus the average of those two years.

General goal

Where other countries stand…
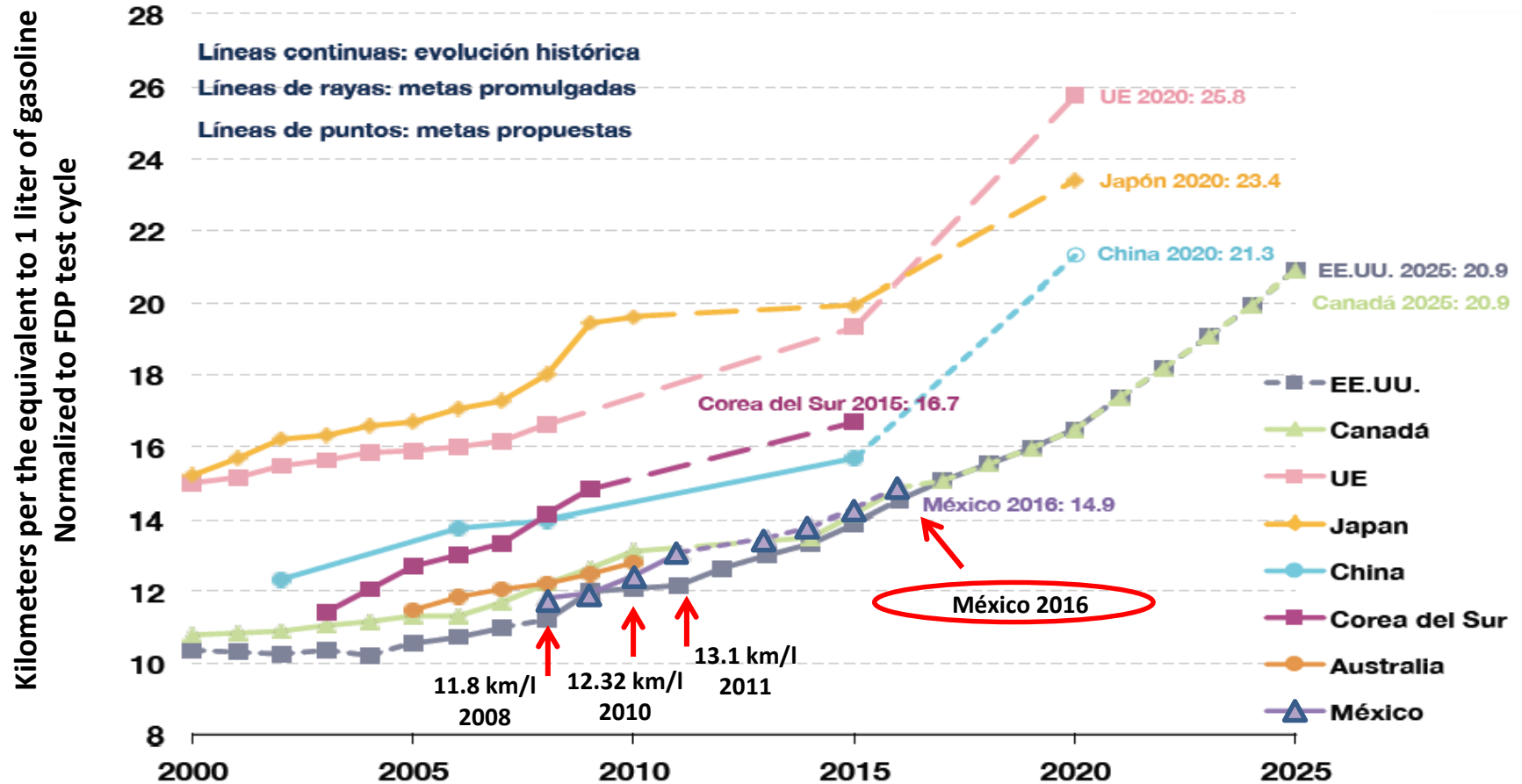
Cost – benefit analysis

Cost and benefits estimated (2013 – 2032)
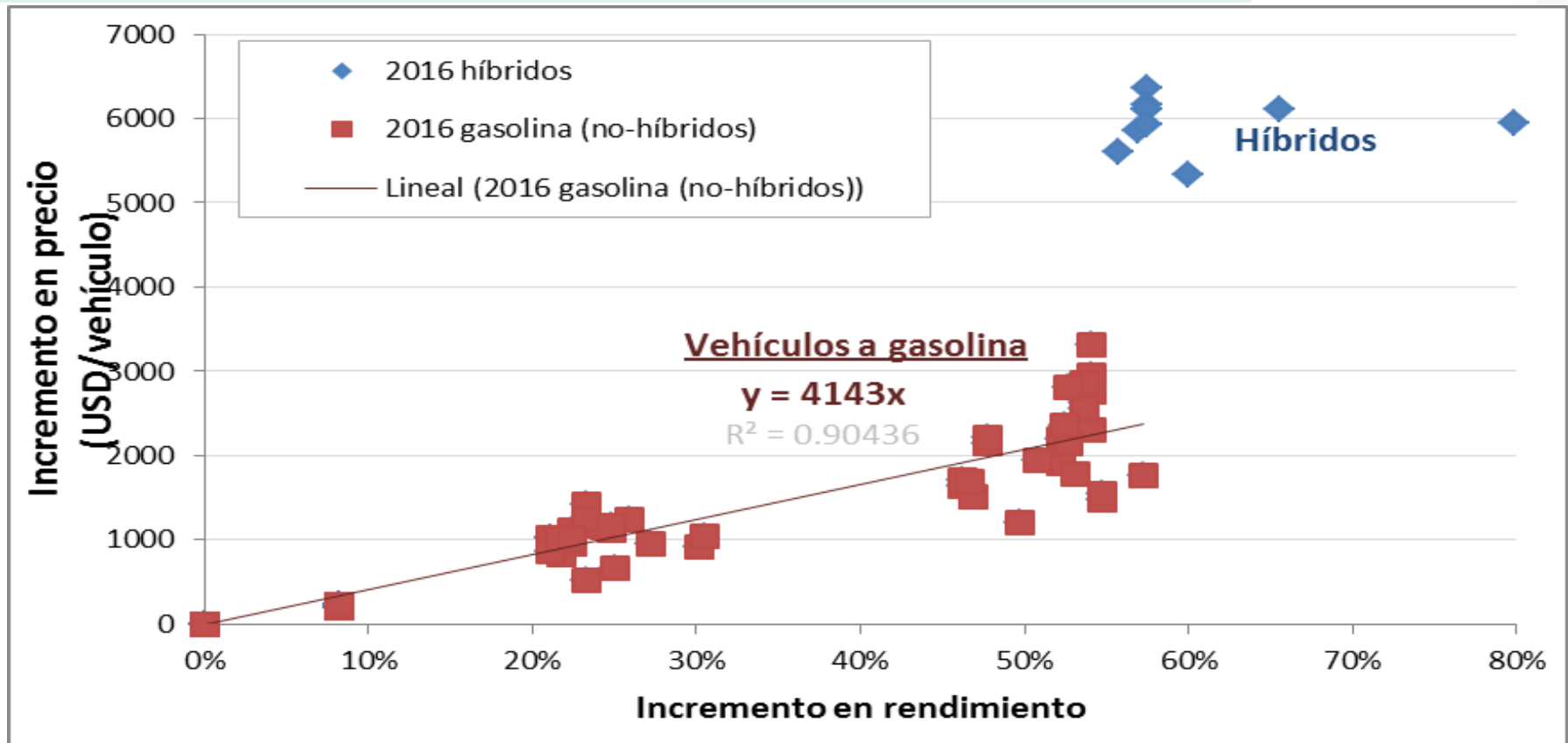
Cost estimations:

- Cost by vehicle category (linked to the technological implementation to increase fuel economy)
- Cost by manufacturer (linked to the technological implementation to increase fuel economy according to their mix of vehicles)

Benefits estimation:

- Energy - fuel savings
- Environmental - avoided emissions of CO_2 and local pollutants
- Health impacts - avoided impacts in terms of mortality and morbidity

The methodology and parameters used in the cost-benefit analysis were chosen in accordance with those of EPA and NHTSA in the CAFE regulation .
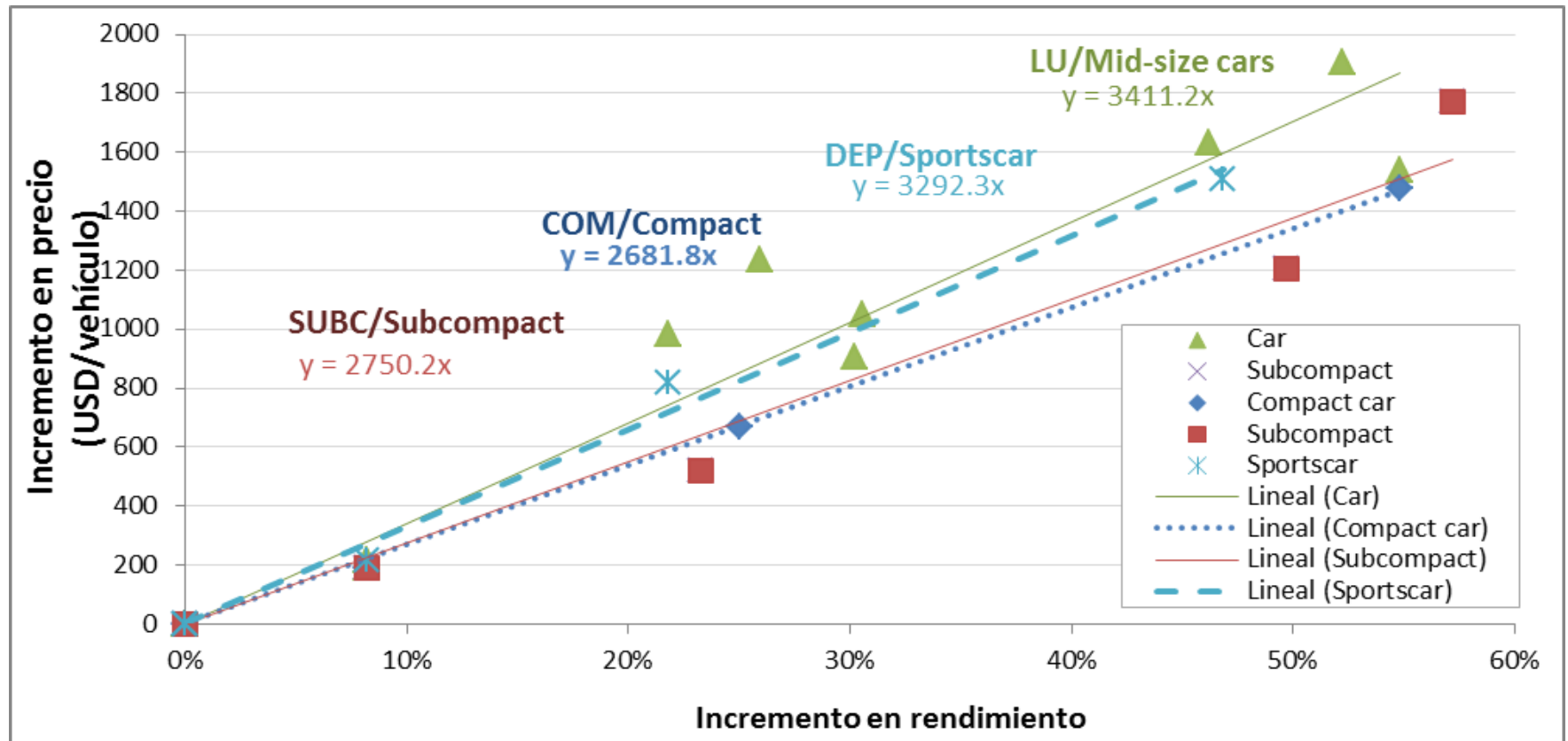
Methodology approach

Source: ICCT, 2010

- Average cost by vehicle – technological packages from OMEGA model, developed by the USEPA

Methodology approach

Source: ICCT, 2010

- Technological packages cost by vehicle category

Methodology approach

Benefits estimation:

- Energy – Bottom up model (to estimate activity level under two scenarios: with and without standard)

- Environmental –Emission Factors (to apply them on fuel savings to estimate avoided emissions)

- Health impacts – Intake fraction method (dose – response rates to estimate avoided cases of mortality and morbidity)

Scenarios for cost - benefit analysis
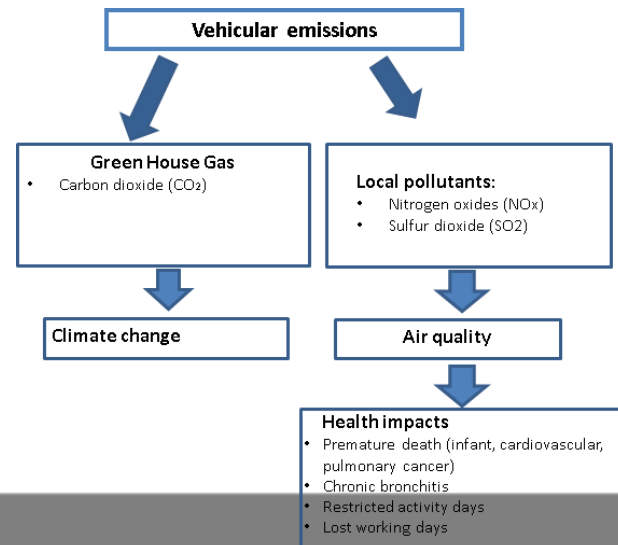
The cost-benefit analysis considers two scenarios: (1) temporary impact scenario and (2) permanent impact scenario .

- **Scenario with temporary impact**. It reports the savings generated by vehicles sold in the period 2013-2032 taking into account its useful life. From 2017, it is assumed that the performance remains the same of the base year (2010) .

- **Scenario with permanent impac**t. It reports the savings generated by vehicles sold in the period 2013-2032 whereas throughout its useful life. From 2017, it is assumed that the performance remains the same from the last year regulated (2016).

Cost – benefits results

Topic	Million pesos	
Energy (fuel savings)	142,839	1,084,971
Environmental (avoided emissions of CO2)	8,637	76,794
Health (mortality and morbidity)	4677	26,818
Total benefits	156,153	1,188,583
Total costs	39,652	270,840
Benefit/cost rate	3.9	4.4

Benefit/cost ratio: 3.9 – 4.4

Regulatory alternatives

Identification and evaluation of alternatives to regulation

- Not to issue regulations

- Decree of the average minimum fuel economy by company (PREMCE)

- Information to the consumer

- Voluntary agreements with the industry

- Economic incentives

- Increase the price of fuel

- PREMCE is similar to the proposed rule (corporate averages) but the costs of compliance would be higher since it does not incorporate flexibilities.

- Information to consumers: Experts on this topic agree that information is a fair, useful and necessary, but not sufficient.

- Voluntary agreements: National and international experience shows that the voluntary instruments to achieve goals of environmental performance of new vehicles are not effective.

- Economic incentives (*feebate)*: International experience shows that its instrumentation helps achieve additional reductions that are achieved with the implementation of the standards.

- Price of fuel: The most effective to reduce fuel consumption but it faces political barriers.

- None of the alternatives evaluated has the expected results of the Project of NOM

- In the short term it reaches a greater cost benefit than the other options.

- In the long term allows greater benefits country since the gradual renewal of the vehicle fleet will be accompanied by technological improvements

- Its compliance is mandatory

- It gives certainty to the subjects covered in terms of the specifications that must be met.

- It includes several flexibilities to meet the goal and reduces the cost for the industry

Methodological problems (obstacles)

Inputs to bottom up model

Different test cycles

Aggregated information

National costs of technological packages

Recommendations and lessons learned

Lessons Learned

- Strong work relationship and collaboration among government agencies

- Technically robust proposal –ICCT's role has been key

- Dialogue / communication with industry to better understand their concerns (whether valid or not)

- Negotiating strategies with industry's Mexican and international reps

- Long processes – continuous effort and energy needed

Concerns of the industry

1. **The Mexican regulation is more strict than the one in the USA because it does not include all the flexibilities**

2. Mexico's altitude and orography

3. Emissions: new vehicles vs. used vehicles

4. Availability of ultra low sulfur fuels

5. Credits: for technology, fuel, early credits

6. Impacts in sales: substitution for used vehicles.

7. Size of the Mexican market

8. Per capita income

9. Low friction wheels